Ant Plant (*Myrmecoda tuberosa*) host plant for the Apollo Jewel (*Hypochrysops apollo phoebus*) with attendant ant *Philidris cordatus stewartii*

METAMORPHOSIS

AUSTRALIA

Magazine of the Butterfly & Other Invertebrates Club

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Planning and Organization Meetings

A quarterly meeting is scheduled in order to plan club activities and the magazine. See BOIC Programme.

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Membership fees are $30 for individuals, schools and organizations.

Aims of Organization

- To establish a network of people growing butterfly host plants;
- To hold information meetings about invertebrates;
- To organize excursions around the theme of invertebrates e.g. butterflies, native bees, ants, dragonflies, beetles, freshwater habitats, and others;
- To promote the conservation of the invertebrate habitat;
- To promote the keeping of invertebrates as alternative pets;
- To promote research into invertebrates;
- To encourage the construction of invertebrate friendly habitats in urban areas.

Magazine Deadlines

If you want to submit an item for publication the following deadlines apply:
March issue – February 1st June issue – May 1st
September issue – August 1st December issue – November 1st

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Cover Painting

Ant Plant (*Myrmecoda tuberosa*) - painting by Gwenda White

From the President

I always ask Daphne to send me the near-final version of our magazine before penning my small addition and once again I must thank all those who have contributed to make this edition another interesting and informative read. Very few of the club members are "early" members so I am sure Helen Schwencke's account of the formation of BOIC twenty years ago will be news to most of us. Kris Di Marco kindly read back through a large number of articles from the club's past newsletters and made a list of some that she thought we should reprint. We have included a few in this publication.

As foreshadowed in the last edition, you will have received our special edition 20th Anniversary Calendar with your magazine. The images are great examples of Lois's wonderful artistic skill and I know they will provide a visual feast throughout 2015.

The Brisbane "Ekka" has come and gone – ten days of crowds and colour. There was a great deal of interest in the BOIC display with an almost continuous stream of visitors from 9am to 5.30pm each day. The stars of our show had to be Alexander Davies's stick insects with John Klumpp's stingless bees as best supporting actors! I personally thank each of our team of wonderful helpers: Chris Adams, Connor Adams, Kieran Adams, Alan Allison, Elaine Allison, Dennis Bell, David Burgess, Judy Burgess, Harvey Clarkson, Jocelyn Clarkson, Alexander Davies, Jill Fechner, Ian Ferrier, Graham Forbes, Margaret Greenway, Ann Huthwaite, Marie-Louise Johnson, Raylene Kendall, Sarah Kendall, John Klumpp, Trevor Lambkin, Tina Lambkin, Glenn Leiper, Judy Leiper, John Moss, Lititia Paulo, Jan Priest, Helen Schwencke, Jacob Smith, Dennis Tafe, Leah Tafe and Richard Zeitek. I know your support has allowed each visitor to carry away a positive message.
Best wishes *Ross*

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The intriguing Apollo Jewel butterfly (*Hypochrysops apollo* Miskin, 1891); its remarkable hostplants and ant associations – *John T Moss*

This medium sized butterfly is one of 18 Australian *Hypochrysops* species in a genus of spectacularly coloured butterflies in the family Lycaenidae. There are a further 39 species scattered across the western Indonesian islands, Papua-New Guinea and the Solomons. The Apollo Jewel (wingspan: male 34 mm; female 36 mm) is one of the largest in the genus, and because of the bright orange livery of its upperside wings, one of the prettiest. Additionally, as in most species, the underside markings include iridescent pale blue lines and spots; thus the origin of the generic popular name "jewels"! There are three named subspecies: two, including the nominate (*H. apollo apollo*), in North Queensland and a further subspecies in PNG. We share one subspecies (*H. apollo phoebus*) with our northern neighbour. Parsons (1999), quoting Don Sands' 1986 *Hypochrysops* revisionary monograph, notes that " a specimen from Sulawesi and those from the Bismarcks, probably represent two additional races" bringing the total to 5 subspecies.

Distribution and hostplants

The southern (nominate) subspecies (*H. apollo apollo*) is restricted to the coastal area adjacent to the wet tropics and occurs from Cooktown south to Ingham, usually inhabiting melaleuca paperbark woodlands and wetlands, where the larval food plants (known as "ant-plants") grow as bulbous epiphytes, particularly on the trunks and branches of papery-barked *Melaleuca viridiflora* and *Lophostemon suaveolens*. Near Cooktown and Innisfail, both butterfly and hostplants also occur commonly in mangroves (C. J. Muller, in Braby, 2000).

Hypochrysops apollo apollo (male) Innisfail NQ
Photo Geoff Walker

However the distribution is not continuous, as the populations are highly fragmented due to habitat loss from widespread land burning and clearing for sugar cane crops and pine plantations (Sands, 1990). More recently clearing has also been for prawn farming and tourist resorts! The larval food plant for the southern subspecies, *Myrmecodia beccarii* (family Rubiaceae), is known to occur as far south as Saltwater Creek, just north of Townsville, but the butterfly has never been recorded there. Due to these factors, there has been a gradual decline in the numbers of both butterfly and ant-plant over the last century. Because this subspecies remains threatened it has been

given the Queensland conservation status of Vulnerable and all activities that may impact its continued existence have to be considered in the environmental impact assessments (Curtis et al, 2012).

The northern subspecies (*H. apollo phoebus*) occurs from near Port Moresby in PNG, some Torres Strait islands, and fairly continuously in suitable habitat, from Cape York to the McIlwraith Range and the Rocky River (Braby, 2000). In some areas such as Iron Range it can be fairly common. Compared to the previous subspecies its populations are reasonably stable and secure.The hostplant of this subspecies is another ant-plant, *M. tuberosa* but unlike the southern species this epiphyte is not often found on paperbark melaleucas. It prefers to grow on rough-barked eucalypts, often in company of a related species *M. platytyrea* subsp. *antoinii,* which is itself not known as a host for the butterfly (Kapitany & Rowe, 2012).

Hypochrysops apollo phoebus (female)
Photo Geoff Walker

Kapitany & Rowe state that another factor which may have influenced the decline of the butterfly's southern subspecies and its hostplant, “was butterfly collecting in the last century. Only a few plants have larvae inside and there is usually only one larva per plant. As a result many plants were destroyed in an endeavour to obtain larvae or pupae that eventually could provide pristine, freshly (emerged) butterflies”. Since 1992 when it was first established that the southern subspecies was seriously threatened, all *Myrmecodia* species ant-plants were given protection by law in Queensland.

Butterfly, ant and hostplant relationships

The association of butterfly, an ant and the hostplant itself exhibit a remarkable case of mutualistic symbiosis or interdependence. As the ant-plant grows it develops small hollows, many of which join to form tunnels and chambers. These so-called 'galleries' become occupied by a species of small ant, *Philidris cordatus,* formerly *Iridomyrmex cordatus* (family Dolichoderinae), and known as the Golden Ant.

Adult butterflies deposit eggs on the lower surface of the tuber and the resultant larvae penetrate the bulbous base and commence feeding on plant tissue within the galleries, thereby creating more tunnels and chambers, which the ants utilise for nesting. The larvae are also known to feed on leaves of the plant at night and can access them by making a small irregular hole to the outside, usually at the very base of the tuber (Common & Waterhouse, 1972). They also use this exit hole, from which the adult butterfly will eventually emerge, to eject their droppings or frass. Pupation occurs

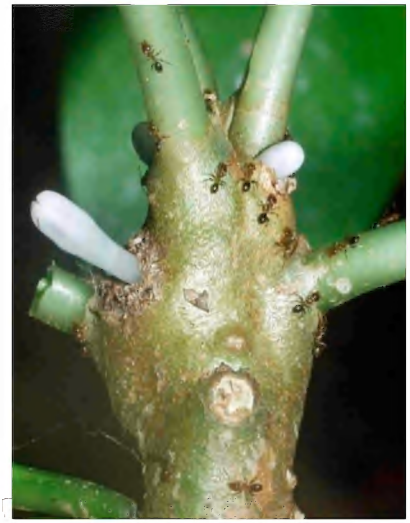
within an enlarged chamber near the exit hole, the pupa being attached to the substrate by anal hooks and a central silken girdle. Generally not more than one larva is found in any one plant, although larger plants occasionally house two or more larvae (Braby, 2000).

Hypochrysops apollo phoebus, Apollo Jewel larva – Photo W. Jenkinson

Hypochrysops apollo phoebus, Apollo Jewel pupa Photo W. Jenkinson

The ants obtain nutritional substances such as peptides and sugars from glands on the dorsum of the butterfly larvae. In return the larvae are protected from predators by the presence of the ants, which also give the plant some protection from 'pest' browsers. Meanwhile the plant benefits from certain nutrients in organic debris, brought in by the ants from the outside, from areas far beyond the possible reach of its own roots, and deposited in some of the chambers (Kapitany & Rowe, 2012).

Ant-plant *M. tuberosa* (close-up showing spiny armour) - Photo Attila Kapitany



Golden Ants (*Philidris cordatus*) on *M. beccarii* stem - Photo Attila Kapitany

Dissected *Myrmecodia beccarii* tuber showing galleries containing *Philidris cordatus* ants and larvae of Apollo Jewel. The chambers at the top of the tuber show debris left by ants. Darker walled chambers/tunnels have a rough surface and prominent "white warts" which can absorb nutrients for the plant's needs. The main ant entrance is the cavity at the very base of the tuber. Image doesn't show separate Apollo Jewel larval tunnelling.

Ant-plant *Myrmecodia beccarii* - two adult plants, in company with the epiphytic aesclepiad "Button Orchid" *Dischidia nummularia*, on the paperbark tree (*Melaleuca viridiflora*).

M. beccarii (juvenile plant)
Photos this page Attila Kapitany

As well as its relationship with the Apollo Jewel, *Philidris cordatus* also has mutualistic associations with several other lycaenid butterflies, including four other jewels viz: *Hypochrysops elgneri, H. hippuris, H. theon* and *H. narcissus* as well as *Ogyris aenone* and *Jamides cyta*, although this last-named association is more incidental (facultative) rather than essential (obligately) as in the remainder (Eastwood & Fraser, 1999).

Acknowledgements
I thank Graham Forbes for the loan of some historical set specimens for photography and likewise Wesley Jenkinson for photos of some of his set specimens, larvae and pupae. Geoff Walker generously provided high quality photographs of live adults of both subspecies

from his extensive butterfly photogallery website. Gwenda White and Attila Kapitany (at short notice!) kindly provided the images of the ant-plants for which I am most grateful.

Hypochrysops apollo phoebus set specimens from Iron Range NQ
Photo W. Jenkinson

Hypochrysops apollo apollo set specimens from Annan River, Cooktown NQ
Photo J. Moss

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Copies of Attila Kapitany's Ant-Plant book (no.5 in a series) are available from Kapitany Concepts, 3 Norwich St, Boronia VIC 3155 (or gecko@connexus.net.au). His interesting website, www australiansucculents.com, is worth a look. It also has details of his other publications.

PLANT PROFILE

Ant-Plants - *Gwenda White*

These are technically called *myrmecophytes* which translates as 'ant-plants'.

In Australia a range of very different species have evolved to form this grouping. These are unusual and fascinating because they have developed close relationships with ants that primarily involve providing them with ready-made homes within hollow stems or leaves.

These plants have adapted to habitats that are often nutritionally very poor, so living ants provide essential nutrients to ant-house plants. This is achieved by filling specially evolved plant cavities with nutrient-rich organic matter brought from areas far beyond the possible reach of ant-plant roots. In return the ants receive a measure of protection from pests. In Australia the ant species that inhabit the tunnels and chambers is the Golden Ant (*Philidris cordatus*).

Ant-Plant (*Myrmecoda tuberosa*)
Photo G&K White

There are three species of *Myrmecoda* in North Queensland – *M. platytyrea* in Mossman Gorge, Daintree N.P. and Cape York Peninsula, *M. beccarii* in Coastal Queensland from Ingham to Cooktown, and *M. tuberosa* in Cape York Peninsula.

Ant-Plant (*Myrmecoda tuberosa*)
Photo G&K White

The very attractive Apollo Jewel butterfly (*Hypochrysops apollo apollo* and *H. apollo phoebus*) is dependent on *Myrmecoda* for its survival. The larvae of this butterfly feed exclusively on various parts of the plant and shelter within. The ants also nurture the larvae and protect them from predators in exchange for a sugary secretion from the larvae.

My painting, which appears on the cover of this issue, is of *M. tuberosa.* I have visited Iron Range in Cape York Peninsula on several occasions and camped under trees where they were growing. At both Claudie River and Gordon Creek camp grounds there were numerous plants on many of the trees, some within easy reach for photographers. On one occasion I found one that had fallen to the ground - a bonus for a botanic artist. It brings back memories of one of my favourite holiday destinations.

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ITEMS OF INTEREST

Happy 20th birthday to the Butterfly & Other Invertebrates Club – how it all got started and musings - *Helen Schwencke*, Founding and Past President (1994 – 2006)

The seed, first planted in 1983, has grown over the last 20 years into the Butterfly & Other Invertebrates Club (BOIC) a respected citizen science organisation. The seed was a New Scientist article highlighting how much harder it was to run a "Save the Snail" campaign than a campaign based on "Save the Whale". The article referred to invertebrate conservation and focused on a species of snail that was down to its last eight live members.

The New Scientist article formed the basis of my first public speech on invertebrate conservation. Also in 1983 Frank Jordan and I came upon information that identified many of the host plants for specific butterflies. That information, not well known at

the time, provided a wonderful catalyst to bring together two interests: native plants and insects. Raising caterpillars and photographing their life-cycles was a logical next step.

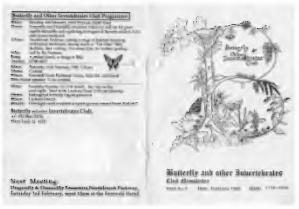
By 1992 we had enough material to write and publish *Butterfly Magic: Bring Back the Birdwing & other butterflies to our backyards* (Earthling Enterprises). The high level of interest in our book, with sales at expos and stalls. creating media interest with Totally Wild articles and newspaper stories, led me to create an Expression of Interest Form about starting a Club.

By September 1994 we had collected the contact details of over sixty like-minded people. Now to get them together in the same room. I mailed out invitations to an inaugural meeting at West End State School in late October 1994. Enthusiasm for the idea was evident by the circa 30 people who attended this meeting. The meeting accepted the current name "Butterfly and Other Invertebrates Club" (to signal a broader interest than butterflies and provide a platform for growth), the aims/objectives, and adopted myself as President, Rob MacSloy as Treasurer and Georgina John as Secretary. We then started meeting regularly. After a few meetings at West End State School our meeting moved to Runcorn State School through the kind offices of Georgina John.

February 1995 BOIC's logo, developed by Lois Hughes, gave the Club a visual presence. The seed planted more than a decade previously had germinated. For our first year the minutes of our meetings also acted as our newsletter carrying a summary of talks, items for interest, records from excursions, along with forthcoming activities. Janet White contributed some lovely butterfly line drawings.

At BOIC's first AGM held on 26 Oct 1995 the Club had 30 financial members. At that meeting previous office bearers were re-nominated to and accepted their positions.This meeting also marked the point when we separated our planning activities from our talks and excursions. We started holding quarterly meetings to discuss Club affairs.

Daphne Bowden and Georgina John accepted a joint newsletter secretary position to produce a quarterly publication containing forthcoming events, articles, reports and observations. Working with Daphne and Georgina, I developed a structured format and layout to provide consistency of presentation. Lois Hughes emerged as contributing artist with her delightful illustrations and after the first year Daphne became sole secretary/editor. First produced in Feb 1996, the newsletter has since documented the Club's many activities and has now, under the stewardship of Ross Kendall as President, transformed into the colourful Metamorphosis Australia Magazine. The magazine makes a wonderful contribution to the promotion of the Club's aims.



Butterfly and other Invertebrates Club Newsletter

Next Meeting

The cover of the first Newsletter

In the interest of history those first thirteen months of activities, predating the publication of the first BOIC newsletter, were as follows:

- Dec 1994 - joint activity with newly forming Sunshine Coast Butterfly Group at Mapleton;
- Feb 1995 - Prof Roger Kitching on insect biodiversity;
- March 1995 - excursion in Redlands led by John T Moss MD;
- April 1995 - Dr Don Sands and Sue Scott on the Richmond Birdwing butterfly;
- May 1995 - John Hall from the Butterfly House at Southbank on butterflies and moths;
- May 1995 - information stall at Pet and Hobby Expo;
- June 1995 - Dr Geoff Monteith on an inordinate fondness for beetles;
- July 1995 - Murdoch De Baar on butterflies and mistletoes;
- Aug 1996 - members short presentations;
- Sept 1995 - an excursion to Venman Bushland Reserve, Redlands Arboretum (now IndigiScapes) and Lorna & David Johnston's butterfly enclosure;
- Oct 1995 AGM - Ric Nattrass on dragonflies and damselflies; and
- Nov 1995 - light trapping event at Bulimba Creek led by John Moss MD.

While all this was happening Rob MacSloy actively encouraged members and others to collect butterfly host plant records to create a database.

The 2nd AGM held on 26th November 1996 initiated the process of incorporating as an Association with the adoption of the Club's constitution and confirmation of the original aims/objectives.The office bearers were re-elected with the addition of John Moss MD as Vice President.

Musings on the journey

Thinking back over the process, BOIC was conceived as a community education project with a focus of active community participation. At the time we didn't know we were creating a citizen science project - the term only coined in the late 1980s by Rick Bonney of Cornell Laboratory of Ornithology. (www.cas.umt.edu/web_apps/avianScience/citizenScience/)

My vision in initiating the group was bringing together lay people with an interest in butterflies and other invertebrates. A network to work together, encouraging lay people to make observations and do research, providing a means for collecting information and sharing observations. Promoting invertebrate habitat conservation, construction and revegetation. Growing an understanding of the small creatures we share our planet with - drawing more people in, stitching together life-cycle and ecological information while ensuring scientific accuracy and encouraging scientific literacy – citizen science.

In the lead up to starting the club I did a scan of the environment, conservation and special interest groups working on nature and more particularly invertebrates. I found very little activity across Australia that was directly aimed at engaging lay people in hands-on experiences of growing plants and raising associated insects in their own backyards. The main organisation involved in the field was the Entomological Society of Queensland with sister groups in other states and a national Entomological magazine. Largely focussed on professional entomologists, the bulk of the work was on species with economic impacts, with some work with Australian wildlife. Community organisations like the Field Naturalists Clubs covered invertebrates as part of excursions and presentations, and the Society for Growing Australian Plants (SGAP) focussed on propagating and growing native plants.

I am proud of my role in developing the Club as its President for the first eleven years until 2006 - at the time I retired membership had grown to 205. Also I am grateful for my experiences and achievements promoting the aims of BOIC and invertebrate awareness, including:

- Development and production of the poster: *Lifecycles of the Swallowtail Butterflies of south-east Qld and northern NSW*. A collaboration between Lois Hughes as artist and myself as main photographer, fundraiser and desktop publisher– with help from other club members and lots of advice.
- In 1998 compiling a Laced Fritillary Recovery Plan using a highly collaborative approach through meetings with all known stakeholders. The process gained compliments from a government officer involved. The Plan narrowly missed receiving Natural Heritage Trust (NHT) funding in 1999 when the fund ran out of money.
- Contributing to a creative invertebrate project for school fundraising with Amanda Grimmett at the Pullenvale State School in 2004. Students sought sponsorship in their community for the number of different types of insects and spiders they found. BOIC developed a range of resources for schools to implement similar invertebrate projects.

Invertebrate project at Pullenvale S.S.

- Organising "Butterfly & Other Bugs in Brisbane" in 2006-07, a BCC funded program which offered twenty-six butterfly and other invertebrate activities: walks, talks and light-trapping across different Brisbane Council Wards.
- Co-author, photographer, producer and publisher of *Create More Butterflies: a guide to 48 butterflies and their lifecycles for south-east Queensland and northern NSW* (2005).
- Editing, producing and publishing *Australian Stingless Bees: a guide to Sugarbag beekeeping* (2007).

- Producing butterfly lifecycle and host plant interpretation posters for forty-four different species of plants.
- Giving presentations about butterflies, their lifecycles and ecological relationships in many and varied settings.
- Organising Woodfordia's Butterfly Project at the Woodford Folk Festival since 2003. This is a major invertebrate community education opportunity with a reach of 120,000 attendees annually. Activities include a monthly working bee and during the Festival: morning walks for patrons, lifecycle interpretation signs on a variety of known host plants, Insects@Night presentations, volunteers wearing spectacular costumes representing real butterflies and one dragonfly, and a display stall with information.

I also acknowledge Frank Jordan's integral contribution to the formation of the Club and his extensive and ongoing role in the various projects and developments, giving talks, running information stalls and his involvement with the Woodford Folk Festival.

Musings on the future

Possibilities for the Club include:

- setting up special interest networks within the Club to encourage participation and contribution to our knowledge base about lesser understood invertebrates;
- organising an annual or biennial Invertebrate Expo in partnership with other relevant organisations - seeking funding, sponsorships and expanding the volunteer base for BOIC and the Expo through the services of Volunteering Queensland;
- producing an occasional paper, refereed in part or whole, allowing the Club to publish scientific and technical papers and information on an "as needs" basis while leaving the magazine to be accessible for a lay audience. Such an occasional paper could be a joint effort with other like-minded organisations.

My thanks goes to the club for the opportunities it gave me to fulfil my interests in invertebrates, share this with others and bring new people into the fold. I also thank the Club for recognising my contribution as the founding President by conferring a Life Membership. Best wishes for the next 20 years.

Footnote:

I note with great pleasure that Wildlife Australia, produced quarterly by the Wildlife Preservation Society of Queensland, which ran great articles on a range of invertebrate topics over time, has these last eighteen months, integrated the subject of invertebrates into its contents thereby vastly increasing the information available to a lay audience.

The following is an article reprinted from Newsletter #14 September 1999

BRISBANE'S SWAMP BUTTERFLY HABITAT

Many butterfly species have been disappearing from the City of Brisbane during the last one and a half centuries. The Butterfly & Other Invertebrates Club (BOIC) decided to investigate the status of three of these lost butterflies.

This project received a community group environment grant from the Brisbane City Council in 1998. The aim of this project was to identify existing host plant sites, identify sites for potential enrichment and revegetation, raise awareness and network with Brisbane-based community groups which have an interest in local habitats and revegetation.

Each of these butterflies under consideration has very specific host plant needs. This close association of butterfly and plant made it possible to focus on the host plants rather than the butterflies. These butterflies were chosen because they seemed most at risk and also occurred in similar or adjacent wetland habitats.

The butterflies chosen were the Australian Fritillary (*Argyreus hyperbius*), the Brown Soldier (*Junonia hedonia*) and the *morrisi* subspecies of the Swordgrass Brown (*Tisiphone abeona morrisi*). The Fritillary is listed as endangered in Queensland and hasn't been officially sighted in Queensland since 1994. The Brown Soldier once occurred as far south as Southport, but its range is now contracting northwards where it is still common. The local subspecies of the Swordgrass Brown has not been sighted in Queensland for a long time, its range has been contracting southwards to New South Wales where it is still common in coastal areas. Another subspecies of the Swordgrass Brown occurs north of the Maroochy river.

The host for the Fritillary is the Arrowhead Violet (*Viola betonicifolia*) a small herb which grows in melaleuca woodland. It also grows in a variety of other habitats such as the slopes of the Great Dividing Range, but the Fritillary is not usually found in these places. The hosts for the Swordgrass Brown are two species of Swordgrass (*Gahnia clarkei* and *Gahnia sieberiana*), which are large grasslike plants that can grow to two metres tall. The host for the Brown Soldier is Karamat (*Hygrophilla angustifolia*), a small plant of melaleuca woodland and creek edges.

Sites examined were mostly restricted to publicly owned land. The aim was to locate as much remaining habitat with the limited resources available. Unfortunately some promising areas were not adequately surveyed because of resource constraints. For instance, the large Oxley Creek catchment received only two visits (Willawong and Corinda) and neither produced any positive host plant records. Most site visits produced no positive results but the ones that did are listed below.

1. Host plants:
These were found at:
Deagon wetlands - which has both the Arrowhead Violets and Karamat, and is a significant site.

Boondall wetlands - a number of Karamat plants were located here. Small numbers of violets were found on both sides of the Gateway Motorway. Tinchi Tamba Wetlands - no host plants were found onsite, however it is a promising site for enrichment.
Bill Brown Sports Field - one Karamat plant was found
Roghan Rd/ Telegraph Rd., Fitzgibbon - on the Roghan Rd side there are still significant numbers of violets and Karamat. It was not possible to examine the Telegraph Rd side. Violets and Karamat were present at this location several years ago, but none were visible from the footpath.
Ransome Park - Chelsea Rd - a large population of violets exists in this location on both sides of the road.
William Taylor Memorial Sportsground - two violet plants were still surviving in a drainage canal
Heer Park, Wondall Rd. - one solitary Karamat plant was found in a stand of Melaleucas. The site had recently been sprayed with herbicide.
Wakerley Park, Runcorn - a significant population of Karamat was found in the Bonemill St corner of the park
Yugarapul Park, Sunnybank - has a very large and significant area of *Gahnia sieberana*
Kuraby bushland - Gahnia clarkei grows in profusion along sections of the creek line.
Karawatha Forest - Gahnia clarkei occurs along at least one creek line and *Gahnia sieberana* is recorded on a plant list for the forest.
Tingalpa Reservoir, *Burbank* - Violets were located on private land in one of the western gullies leading down to the lake.
J C Trotter Memorial Park, Burbank - Gahnia sieberana was found

2. The Butterflies

The Australian Fritillary

The Fritillary was recorded at Indooroopilly in 1916.The butterflies and violets are now gone from there. The swamp has been filled and transformed into a sports field. This scenario has been repeated in many places and times since then. Much of the remaining wetland has been invaded by exotic weeds.

Unfortunately not enough is known at this stage about the ecology of the butterfly to make firm recommendations for its management. It is probably firmly linked to the ecology of the violet and future studies done at sites noted in this survey will no doubt

Australian Fritillary life cycle

provide valuable insights in this regard. The interim recovery plan for the Australian Fritillary has made provision for these studies to be undertaken when funding is provided. In the meantime it is important that no further damage be sustained by the existing patches of violets.

In particular the site at Ransome Bushland should be preserved from any further damage. It has the largest population of violets and these still show some level of genetic diversity. The planting of violets at Melaleuca Environmental Park should be maintained and extended. This park is large enough to provide backup on the southside for the first site should an accident befall it.

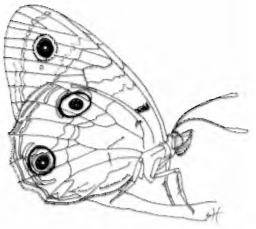
The sites on the northside are important because, when taken as a whole, they cover quite a large area. There is also a possibility that there may be additional suitable violet habitat within the adjoining casuarina forest at Brisbane Airport (in one site outside Brisbane the violets were found growing in association with casuarinas). With appropriate management, including enrichment and revegetation, there would certainly be enough biomass of violets available to support many Fritillaries on a long-term basis. There is scope for extensive revegetation with violets in the Tinchi Tamba Wetlands and this would provide part of a corridor linking existing habitats in Redcliffe and Caboolture.

Sources of plants for enrichment need to be carefully considered. Normally diversity would be maintained by propagating from plants found locally. However it is clear that some local populations have passed through a genetic bottleneck and do not display the great genetic diversity found in large populations of violets in relatively pristine sites. This happens when plant numbers are drastically reduced and accentuated by the way that violets produce their seeds asexually for most of the year. Characters that show diversity include: flower colour (white, pink, many shades of purple), shape and scent; leaf colour, shape, size and stiffness; size, colour and number of seeds; etc.

In practice this means that existing sites should be enriched with seeds from local plants but that new sites should be planted with seeds from as many different sources as possible. The forces of natural selection would produce a mixture of forms suitable for that site and the population would have the depth of genetic diversity needed to cope with the difficult niche occupied by the violet.

The Swordgrass Brown

One of the most exciting results of the survey was locating several Swordgrass sites along the Karawatha-Bulimba creek corridor. These sites included both species of Gahnia. While there are undoubtedly enough plants here to support several colonies of butterflies much work needs to be done to ensure their future survival. A local revegetation



Swordgrass brown

group has already started the process of identifying and implementing the necessary specific actions.

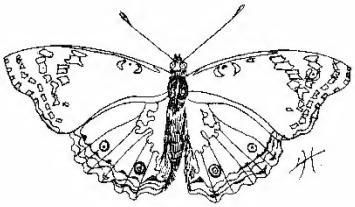
Some work towards the re-introduction of the butterfly in Redland Shire has already been started. This work will be coordinated with work being done in Brisbane. Interesting work has been done in the City of Knox in Victoria to create corridors to join up populations of their local sub-species of Swordgrass Brown and this has provided some incentive for the re-introduction of our local sub-species.

This butterfly is much better understood than the Fritillary and its introduction to a site is relatively straightforward, as long as the initial introduction contains enough individuals to ensure some genetic diversity. When this work matures the citizens of Brisbane will once again be able to enjoy the sight of this beautiful butterfly.

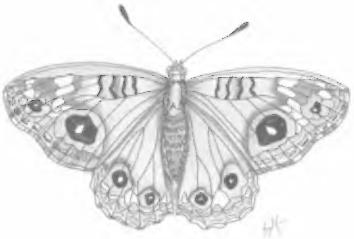
The Brown Soldier

This butterfly has the most optimistic future because there was a probable sighting on a specimen at Thorneside in December 1998 by a member of BOIC. As well its host plant has the widest geographic spread of sites of the three butterflies in the survey.

Karamat can hold its own against some exotic weeds and germinates readily from seed unlike Arrowhead Violet. Cuttings placed in a glass of water will readily form roots. It does prefer much wetter conditions than the violet. It usually dies back to ground level in winter, and this may give some of its exotic competitors a head start before warm conditions return.



Blue Argus



Meadow Argus

The host plant has the added bonus of also supporting the native blue-banded bee and three other butterflies - the Tiny Grass Blue, the Blue Argus and the Meadow Argus. These butterflies have other host plants in addition to Karamat, but any extra food sources for them would undoubtedly increase their numbers. The planting of Karamat in Seventh Brigade Park has already resulted in the establishment of a colony of Tiny Grass Blue butterflies there.

While weed control would certainly be necessary, Karamat has a potentially large habitat available for it. Along many creeks there is already a similar exotic weed established that could be replaced by it. Even creeks that have been turned into drains or canals are suitable, as long as they don't have concrete sides. The main limiting factor would be the number of people willing to put time and resources into establishing and maintaining this plant in any suitable spot. Most of these suitable

spots are presently occupied by exotic weeds and unsuitable for trees because of flood control regulations. Wouldn't it be great to plant a genuine native and four star butterfly plant in these spots?

It would also be important to maintain any existing populations in places such as Boondall Wetlands. While there is not as much diversity in Karamat plants in pristine habitats as compared with violets it is still worth preserving what remains. Boondall still has quite a few plants as does Deagon Wetland. The single plant surviving in Heer Park provides a classic example of a genetic bottleneck.

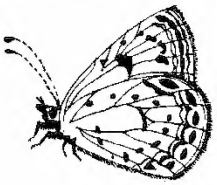
3. Experimental Plantings

In consultation with local groups seven sites were selected for experimental plantings of violets and/or Karamat. Unfortunately supplies of Sawsedge plants were not available.

The locations were:- Teralba Park, Everton Park; Sherwood Arboretum, Sherwood; Seventh Brigade Park, Chermside; Melaleuca Environment Park, Manly West; Enoggerra Creek, The Gap; Butterfly habitat, Dutton Park; Wakerley Park, Runcorn

Results of the plantings were mixed but generally encouraging. The dry weather during the early part of the project did not help the establishment of the plants. The more recent wetter weather has increased survival rates. The main lesson to be learned was that a lot of effort needs to go into weed control in the early stages.

The most gratifying result was the establishment of a small colony of Tiny Grass Blue butterflies on the Karamat plants in Seventh Brigade Park. A small taste of what is possible for the other butterflies.



Tiny Grass Blue

If there is an increase in interest in helping the recovery of these butterflies, these sites will provide an important focus for any involvement that people want to provide. If more people become involved more sites can be developed.

Of particular interest is Wakerley Park. Though most of the park has been filled and leveled a small portion on the corner has escaped and retains the original topography. Bounded by streets on two sides, a creek and a sports field on the other two sides, it would be isolated from sources of new weed infestations if it was rehabilitated. By including other swamp plants as well as the butterfly host plants it would provide an example of a plant community that has almost completely disappeared from Brisbane. Best of all many of these would be visible to the public from the footpath.

4. Public awareness and networking

As part of this project the Butterfly & Other Invertebrates Club conducted an informal program of providing basic information on butterflies to any interested group. This involved a general presentation using slides of butterfly lifecycles to a variety of

groups. Sometimes it also included involvement in planting of butterfly host plants in revegetation projects.

Hopefully this public education will be expanded to include specific activities around the butterflies in this report. However this will require a high level of time, commitment and resources which are not available at the moment.

The Butterfly Habitat at Dutton Park was initiated in cooperation with the Dutton Park Scout Group. It contains specimens of all of the host plants covered in this report, and is being developed primarily as a resource for revegetation groups. It is anticipated that it will contain specimens of most of the local butterfly host-plants for south-east Queensland in a natural setting.

Conclusion

I would like to thank all those who gave their time and showed me the locations of the target species. This report would have been impossible without them. Thanks also to all those groups who participated in the trial plantings, much valuable information was gained. Thanks also to the Brisbane City Council for assisting with the funding of this project.

Frank Jordan

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Great Carpenter Bee – *Xylocopa* (*Koptortosoma*) - *Erica Siegel*

There are six species of Great Carpenter bees in Australia and they are found in the warmer climate of northern Western Australia, Northern NSW, Queensland and the Northern Territory. They are one of several buzz pollinators.

Great Carpenter bees are the largest native bees in Australia, ranging from 15 to 26 mm. According to measurements in Remko Ley's revision of the carpenter bee genus, the males are either the same size or slightly bigger than the females.

They are also known as Yellow and Black Carpenter bees. The females have a glossy black abdomen and bright yellow fur on the thorax. There is a small oval shaped hairless black area in the middle of the thorax. Males are covered uniformly with yellowish brown or olive fur. Both females and males have black wings.

The females cut nesting burrows with their jaws in soft timber such as the decaying limbs of Mango, Frangipani and Jacaranda trees. Other known nesting trees include, *Ficus* species, *Casuarina, Banksia, Lophostomon grandiflorus, Leptospermum* species, dead flower stalks of Grass trees *(Xanthorrhorea* sp.*)* Soursop *(Annona muricata),* dead saplings of *Eucalyptus robusta,* even old timbers in the back yard. The nesting burrows may contain several tunnels and are partitioned into brood cells with neat disks of chewed wood particles.

The female lays her egg on a mixture of pollen and nectar then seals the cell with the disk of chewed wood particles before placing another egg on a paste of nectar and pollen, sealing it off till the tunnel is filled.

New generations of females often use old nesting burrows. Female Great Carpenter bees are known to share the burrow with their daughters creating a small community, even sometimes feeding their adult daughters, and are therefore referred to as "para-social ".

The Great Carpenter bees are attracted to and feed on native wildflowers such as *Melastoma affine, Senna,* Foam Bark (*Jagera pseudorhus*), *Canavalia rosae,* Native Wisteria (*Callerya megasperma*) and *Cassia* sp. They also visit exotic plants like *Grewia occidentalis*, *Cassia fistula*, Pigeon Pea (*Cajanus cajan)*, Cashew tree (*Anacardium occidentale*), Leopard tree (*Caesalpinia ferrea*), *Solanum* sp., *Laburnams*, Jasmines, *Wisteria*, *Crotalaria, Albizia* sp. and *Tipuana* sp. (a declared weed).

They are able to "buzz pollinate" by grasping the flower with their strong front legs and vigorously vibrating the flower using their flight muscles. "Buzz pollination", also called "sonication", is important for pollinating wildflowers like *Melastoma affine* or flowers where the pollen is trapped in narrow tubes.

To attract females the males emit a pheromone smelling of flowers and pollen. The males are seldom seen as they establish their territories high up in the crown of trees. They detect intruding males by the pheromones they emit and defend their territories.

Similar species of Carpenter bees in other countries are good pollinators of Passion Fruit.

Great Carpenter Bee – *Xylocopa* (*Koptortosoma*) – Photos Erica Siegel

References

Dr.Anne Dollin (Australian Native Bee Research Centre), Australian Museum and Wildlife Queensland

Further information:

Great Carpenter bee information, photos and videos
http://www.aussiebee.com.au/beesinyourarea.html#yellowandblackcarpenterbees

PaDil –Great Carpenter bee *Xylocopa* (*Koptortosoma*)species information
http://www.padil.gov.au/pollinators/search?sortType=ScientificName&viewType=Details&pageSize=10&queryText1=xylocopa&queryType1=all

making artificial nests information
http://permaculturenoosa.com.au/wp-content/uploads/2012/07/BEE-WALL-and-HABITAT-5-page.pdf

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Life history notes on the Ringed Xenica, *Geitoneura acantha* (Donovan, 1805) Lepidoptera: Nymphalidae - *Wesley Jenkinson*

The Ringed Xenica is encountered from the Blackdown Tableland (Atkins 1974a, 1996d, in Braby, 2000) central Queensland southward to Victoria and South Australia. The species is locally common in the grassy foothills of the Great Dividing Range in south-eastern Queensland and northern New South Wales.

The preferred habitat in south-eastern Queensland is eucalypt open-forest and woodland and where the native host grasses are established in large quantities. Along drier hillslopes adults have a preference for damper areas such as along creek banks and gullies.

The adults have a rather slow jerky flight. They can be observed flying within a couple of metres of the ground where they often fly in dappled sunlight. Once the sun is obscured by clouds they quickly settle on low vegetation or on dead leaves on the ground where they are very cryptic. They remain settled with their wings closed for

long periods until the sun reappears. The adults often congregate along moist undercut banks beside tracks or roadways and when disturbed they can fly quite rapidly and can be difficult to follow. Males generally emerge earlier than females in late spring or summer depending on locality. After mating the females remain relatively dormant until late summer and autumn when ovipositing begins (Braby, 2000). Both sexes feed from a variety of small native flowers. They are also known to feed from fermenting tree sap flows especially of *Acacia* and *Eucalyptus* species.

Within south-eastern Queensland adults could be confused with other nymphalids in the satyrinae subfamily particularly the Common Brown, *Heteronympha merope,* which has a similar habitat and flight period. Within the Stanthorpe / Tenterfield region are two other rather similar looking species: the Shouldered Brown, *H. Penelope,* and Marbled Xenica, *G. klugi*. In comparison to these species the hindwing underside of *G. acantha* has two much larger black ocelli (with a small white central spot) and a more defined pattern which is visible when settled. *G. acantha* is also smaller in size than *Heteronympha* spp..

The sexes are similar in appearance. In comparison to the females, the males have a large patch of visible greyish brown sex scales forming a band across the centre of the forewing and the abdomen is longer and thinner.

The wingspan for the pictured males is 40mm and 45mm for the females.

Geitoneura acantha (Ringed Xenica) - Images left to right: male and female

Geitoneura acantha (Ringed Xenica) - Images left to right: male underside, female underside

On a trip during April 2011 to the Bolivia Hill / Deepwater River region, south of Tenterfield in northern New South Wales, a female was collected and kept in captivity. She laid an egg on a grass stem and was then released. This egg was kept for life history studies. Subsequently the resultant larva was successfully raised in captivity on the native Kangaroo Grass (*Themeda triandra*), a known host plant.

The egg was off white coloured (later forming faint pinkish markings), slightly off spherical with longitudinal ribs, approximately 0.8mm high x 0.8mm wide.

Freshly laid egg

1st instar larva

2nd instar larva

3rd instar larva

4th instar larva

5th instar larva

The first instar consumed most of the eggshell soon after emergence. The small larva remained along the underside of the leaf tip feeding from the edge of the leaf. Towards the final instars it sheltered towards the base of the host grass. Throughout its growth it was very sluggish and was only observed feeding at dusk from the outer edges of a leaf blade. The larva attained a length approximately 27mm long and completed 5 instars.

The pupa was located attached to the container lid by silk. It was hanging by the cremaster with the head suspended down. In natural conditions the pupae are located on sheltered grass stems. As pictured, it was green in colour with a length of 12mm.

Pupa lateral, dorsal and ventral view

The total time from egg to adult was about 7 months, with egg duration of 17 days, larval duration 176 days and pupal duration of 22 days.

Within the boundary of the new Scenic Rim Regional Council south of Brisbane I have adult records for the months from October to December and April. The adults in this region are probably on the wing from October through to April. This species has one generation per year.

Reference

Braby, M.F., 2000. Butterflies of Australia – Their Identification, Biology and Distribution. vol 2. CSIRO Publishing.

Photos Wesley Jenkinson

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Another article from the past – Issue #8 March 1998 – Teaching Tips

Lures and Traps for Teaching Kids about Insects by Mike Groth

Kids love collecting and looking at live, creepy crawly things and here are some simple tips for getting a closer look at them by attracting with baits and trapping without harm.

One of my favourite lures which I have found good for attracting certain kinds of moths, butterflies, flies, beetles, ants, wasps, bees and cockroaches is the fermenting fruit bait. To hold the bait I use the leg of an old stocking. Alternatively, a cheesecloth or mosquito netting bag could be sewn up measuring about 300 mm long by 100 mm wide open on one of the narrow ends. The bait consists of some sort of well over ripe fruit – I recommend banana (one that has been forgotten in the lunch box, gone black and very squishy, is ideal and usually easy to get), apricot (3 or 4), grapes (bunch) or a mango. Simply place the fruit into the bottom of the bag and hang on a low tree branch or other support outside so that visiting insects can be viewed easily. Insects will be attracted to feed at the sweet juices which ooze from the decaying fruit and are often so absorbed in the task that one can watch their feeding habits very closely. The bait attracts insects both day and night so kids can

make one at home and watch what comes to it at night too. Another interesting activity is to make up several baits using different fruit (other baits such as decaying vegetable scraps, cloth soaked in sugar water or your own concoction can be tried) and see which one attracts the most or which insects come to each type of bait. Also, insects visiting the bait can be collected, observed in the classroom and then released.

A method for getting a closer look at ground dwelling insects as well as spiders, scorpions and the like is the pitfall trap. A pitfall trap is simply a container buried in the ground so that its top is flush with ground level. The container could be a tin can, ice cream container, bucket or a 20 litre pail or drum with the top cut out. Fast food shops throw out heaps of metal drums with lids. Ice cream parlours are also a good source of containers for pitfalls. The bigger the mouth of the container the more likely wandering invertebrates will encounter it. The pitfall can be made more effective in two ways:

(1) Baiting – hang a little bag over the middle of the pitfall, suspended about level with the ground from a stick, and place some bait in the bag. Piece of raw meat attracts carrion beetles, fresh dog dung attracts native dung beetles, fresh cow manure will attract the introduced dung beetles, fruit attracts beetles and bugs. Again it is worthwhile trying your own ideas for baits.

(2) Fencing – a barrier or fence such as a plank of wood 2 to 4 metres long, or a strip of shade cloth or gauze about 100 mm wide supported by pegs every 600 mm and its bottom edge buried in the ground will guide insects, spiders and the like to the trap. Occasionally small snakes, lizards and small mammals and frogs will be caught especially if large (20 litres plus) containers are used.

Note: When using traps deeper than 200 mm – most mammals and frogs which fall into a pitfall will die if left there during the heat of the day so it is important to check the trap during the morning and observe, collect or release the catch. If the trap cannot be attended to in this manner then it is best to cover the trap with a lid so no animals will be trapped and die.

These activities are simple and effective for getting kids interested because they get to make the item and then also get to observe the results from the trap or lure which they have made. It also makes use of those old squishy bananas hiding in lunch boxes!

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And yet another article from the past - *Issue #40 March 2006* - Processionary caterpillars *Ochrogaster lunifer* *by Murdoch De Baar*

Extra notes on Processionary or Tent caterpillars to the information given in "**Hairy abortions**" (BOIC Newsletter #39: 18 – 20). *Ochrogaster lunifer* (previously known as *Teara contraria*) belongs to the moth family Thaumetopoeidae, and has moths with hairy bodies and wingspans up to 40 to 60 mm. Tents or larval communal shelters are 250 mm or more across.

The Processionary caterpillar is believed to be a complex of species. Around the Brisbane region, it prefers to eat acacia foliage and nest in tents at the base of the trunk. However in the Toowoomba region, the Processionary caterpillar eats eucalyptus leaves and nests in tents strung amongst the foliage. The caterpillar may pupate in these tents or in the soil. When caterpillars are seen wandering around a lawn or away from the tree, it is either because the tent has been breached/disturbed, or they are searching for fresh foliage, or they are searching for a pupation site. The 'species' is known across Australia. In early writings, graziers on their horses, used pole cutters to cut down these aerial tents. However tents falling on the horse and causing the horse to go crazy, are also noted (W.W. Froggatt, 1923. Forest insects of Australia).

Ochrogaster lunifer

My experience with these caterpillars goes back to when I was a boy who couldn't resist collecting a fascinating column of marching caterpillars. I broke out in an extremely itchy rash that lasted three days. I kept some larvae in a tin which was lost in amongst my belongings, until three years later, when I opened this tin to find these dried caterpillars inside. Again I had to suffer three days of unbearable itchy rash. I always believed this species was the worst in the Brisbane region. Australia does have some nasty caterpillars with setae (sharp rigid hairs) that can penetrate skin and eyes, but of the species that have irritating hairs, the Processionary caterpillar is most often seen around Brisbane. Southeast Queensland has larvae capable of causing skin blistering, stinging or rashing from the families Thaumetopoeidae, Eupterotidae, Anthelidae, Lymantriidae, Arctiidae, Limacodidae and Nolinae (Noctuidae). The White cedar moth larvae (*Leptocneria* spp.) can also be irritating, but can be eliminated by not growing White cedars (*Melia azedarach*) or as Don Herbison-Evans and Debbie Racklyeft (authors of 'Hairy Abortions') indicated, by the use of sacks tied around the tree trunk. Hiding larvae can then be removed.

When tents are disturbed, wandering larvae may die away from the tree, thus causing problems for grazing animals and gardeners. Discarded larval skins after pupation can also cause problems. Lawn mowers blow up hairs which land on sweaty skin and cause irritations. Each hair fragments into smaller pieces, and is spread by scratching the site and then touching other sites. The victim’s body will soon be covered with welts.

I consider nests at the base of trees could be burnt, however this could be dangerous as a fire could burn into the trunk of the tree. Tree nests are very dangerous to cut down, because a breeze could blow hairs into the pruner operator. Also falling nests

will break open and spill larvae everywhere. Another control strategy to target is egg tracking. Around the Brisbane area, moths lay egg masses covered with whitish fluff, on the lower trunks of Acacia trees, from November to January. A note should be recorded in your diary to search for eggs during this period, and crush these egg masses. Chemical controls would seem extreme and impractical, because a systemic insecticide would need to be used on breeding trees every year during January to April or May.

I have bred fly and wasp parasites from Processionary caterpillar larvae. A small pyralid moth larva is also implicated as attacking eggs. Birds, for example Cuckoos, have been recorded as eating larvae

There are some excellent articles on the Processionary caterpillar, and in particular, Graham Floater at the University of Queensland, has published some informative findings. I have some **references** below.

Floater, G.J. 1996. Life history comparisons of ground- and canopy-nesting populations of *Ochrogaster lunifer* Herrich-Schaeffer (Lepidoptera: Thaumetopoeidae): evidence for Two species? Aust. Jnl. of Entomology, 35: 223-230.

Floater, G.J. 1996. Estimating movement of the Processionary caterpillar *Ochrogaster lunifer* Herrich-Schaeffer (Lepidoptera: Thaumetopoeidae) between discrete resource patches. Aust. Jnl. of Entomology, 35: 279-283.

Van Schagen, J.J., Majer, J.D. & Hobbs, R.J. 1992. Biology of *Ochrogaster lunifer* Herrich-Schaeffer (Lepidoptera: Thaumetopoeidae), a defoliator of *Acacia acuminata* Bentham, in the Western Australian wheatbelt. Australian entomology Magazine 19 (1): 19 - 24

NEW HOST PLANT RECORD (PRESUMED)

Presumed new hostplant for the Green-banded Jewel butterfly, (*Hypochrysops theon medocus* C. & R. Felder, 1985) – *Jon Marshall*

Last November I was fortunate enough to participate on a three week field trip throughout Cape York Peninsula, sampling 'groundwater dependent ecosystems', often abbreviated as GDEs. These are environments where the ecology depends sometimes or always on access to or discharge of groundwater. They are prevalent on the Cape, with most associated with shallow 'sub-artesian' aquifers. They take the form of vegetation communities with their roots tapping into groundwater; springs with distinct point-source discharge of groundwater to the surface and base-flow streams with diffuse groundwater input feeding stream flow. All of these places are ecologically significant as they tend to be the locations of plants and animals that require frequent access to water, as opposed to the background seasonally wet/dry

conditions of the region. This means that GDEs of Cape York Peninsula support significant biodiversity.

Above - Green-banded Jewel (*Hypochrysops theon medocus*) on fern *Stenochlaena palustris* at Cape York.

Right - Climbing fern *Stenochlaena palustris* (Blechnaceae) at Cape York.

While the work was intense, leaving little time for recreational insect observation, I was particularly pleased at one spring site to encounter a healthy population of the Green-banded Jewel butterfly *Hypochrysops theon.* Males were defending territories in patches of sunlight amongst the dense riparian forest of the spring. All of the individuals I observed were closely associated with a profuse epiphytic growth of the climbing fern *Stenochlaena palustris* (Blechnaceae). I presumed, based on these observations, that this fern must be the jewel's host plant, although no juvenile life stages were encountered. Upon returning home and consulting various reference books I found this is not a known host plant, although all known hosts are indeed other species of ferns of the family Polypodiaceae. So perhaps this climbing fern may be a previously unrecognised host for the Green-banded Jewel on Cape York, but of course direct evidence would be required to confirm this speculation.

The site in question is a small unnamed stream in the Jacky Jacky catchment on the north-east tip of the Cape. Site details are:
Site name: WMS12 Spring Wetland
Latitude: -11.85872 deg; Longitude: 142.65358 deg; Altitude: 84 m
Date: 4/11/2013; Time: 2:30 pm.

Thanks to John Moss for helpful advice on this topic and for encouraging the drafting of this article!

Photos Jon Marshall

Ed: As the photo shows, this is a particularly bright bluish-green colour form of this butterfly and would well be worthy of the common name "Blue-banded Jewel" that the author had suggested. Larvae of this butterfly are attended by the same ant (*Philidris cordatus*) that attends the ant-plant feeding Apollo Jewel (see article herein) and another fern-feeding species, the Paradise Jewel (*H. hippuris*).

BOOK REVIEW

Moths of Victoria Part 5 – Reviewed by

Peter Hendry

This is the latest installment published by the Entomological Society of Victoria attempting to illustrate all the moth lepidoptera of Victoria. It covers the Victorian moths in the tribe Nacophorini which is in the subfamily Ennomonae of the Family Geometridae The editorial team is made up of Marilyn Hewish, Peter Marriott, Ted Edwards, Axel Kallis and Stephen Williams. Peter Marriott who has been the lead author of the first four volumes has taken a back seat and handed the reins of lead author to Marilyn Hewish. Based on the complexities of this group of moths, one could say this was both a brave move by Marilyn and a smart move by Peter. For a start, as pointed out on the CD that accompanies the booklet, the tribe Nacophorini should be limited to Nearctic and some Neotropical genera and that the affiliation of the Australian genera is uncertain. Marilyn and the team have done a superb job with the CD containing several pages covering how to separate several of the more difficult species from one another.

Moths of Victoria
Part 5 - Satin Moths & Allies - GEOMETROIDEA
MARILYN HEWISH
with PETER MARRIOTT, TED EDWARDS,
AXEL KALLIES and STEPHEN WILLIAMS

The 36 page booklet contains images of set specimens of all the Nacophorini to occur in Victoria. One interesting omission is *Chlenias gonosema*, the type species of which has not been found and is only known from its original description. The original description is presented on the CD. The booklet also contains live images of several species as well as some images of larva, pupa and eggs. Thanks to Stephen Williams, between the booklet and the CD, 40 species have their life cycles represented.

The CD contains acknowledgements, notes about the authors, the photographs, photographers, light trapping, an index to all 5 volumes and a note about the society. It also contains a checklist and a list of references as well as a tantalizing look at future volumes, not to mention around 360 pages in PDF format covering more than 160 species of moths in the Nacophorini tribe. Updates to volumes 1, 3 and 4 are also provided.

This volume also brings to light the difficulty of identifying moths from images. On the CD, under the genus *Amelora*, most members of this genus were identified by

dissection and a study of genitalia by Dr. C. Byrne, some images of live specimens proved impossible to identify and have been placed under *Amelora* sp (8).

On the CD for each species the adult flight times,Victorian localities and Australian distribution are given. The wing span of the set specimens on the CD is also provided. The moths in the Nacophorini tribe cover the beautiful satin moths - *Thalaina* spp. - as well as many hard to identify little brown species. This volume goes a long way in sorting out the available knowledge of this tribe and shows up many unnamed species. While centered on Victorian moths, many species occur well beyond the bounds of the Victorian border. I have collected many of the moths represented in this volume from the northern tablelands of New South Wales as well as some in my own backyard in Redland City, Queensland. I recommended it to anyone with a passing interest in Australian lepidoptera.

CORRECTION

Two errors occurred on page 31 of the June edition of this magazine: of the moths illustrated at the top of the page the names of *Capusa senilis* and *Cleora illustria* were inadvertently transposed; near the bottom left, the name of *Grammodes* sp nr *diagarmma* was spelled incorrectly.

YOU ASKED

When Ross Kendall showed me a photograph (Fig. 1) he had received in a letter from Ron May and asked if I knew what moth is was, I immediately replied a *Tonica* species. Though Ron's photograph is not the sharpest, this distinctive moth is easily recognized by its long palpi (sensory appendage extending from the mouth parts) and the shape of the costa (upper edge of the forewing). *Tonica* species also have raised tufts of scales on the thorax and forewing, some of which can be seen in Ron's photo. For a better look at the palpi, costa and raised scale tuffs see Chris Ross' image (Fig. 2).

Fig. 1

Fig. 2

The genus *Tonica* was raised by Walker in 1864. Part of his description describes those amazing palps and reads as follows: *"Palpi slender, compressed, curved, about thrice longer than the breadth of the head ; second joint porrect, densely fringed ; third setiform, ascending, with a very few short hairs, as long as the second, with which it forms a nearly right angle."*. Along with his new genus Walker

described *T. teuasrlla,* from Sarawak, Borneo. In 1879 the Dutch entomologist Snellen described the Australian species *T. effractella*. At the time, Snellen provisionally placed it in the genus *Cryptolechia,* noting that a new genus will have to be formed. Snellen's description covered over 3 pages with 9 figures (Fig. 3 17-25). In 1896 A. J.Turner, probably unaware of Snellen's description, redescribed *T. effractella* as *Teratomorpha coeliota* and noted, "*This curious species is evidently a mimic of birds' droppings".*

In 1922, Edward Meyrick reviewed the genus and placed in it Walker's *T. teuasrlla* as well as *T. niviferana,* a species described by Walker in 1864 as *Binsitta niviferana*, form North Hindostan. *B niviferana* was described in the same publication as *Tonica teuasrlla*. This led to Meyrick, as first reviewer, deciding on which genus name would take precedent. It would be assumed that with *Tonica* being described on Page 788 and *Binsitta* on page 832, Tonica won the battle. Meyrick also made Turner's *Teratomorpha* a synonym of Tonica, which made *Teratomorpha coeliota*, Turner 1896, a synonym of *Tonica effractella*, (Snellen,1879). Other species in the genus at the time of Meyrick's review were, *T. nigricostella*, Snellen, 1901, from Sumatra; *T. Barrowi*. Bingham, 1907 from Burma; *T. senesccns*. Meyrick, 1910 from New Guinea and *T. malthacodes*, Meyrick, 1914 also from New Guinea.

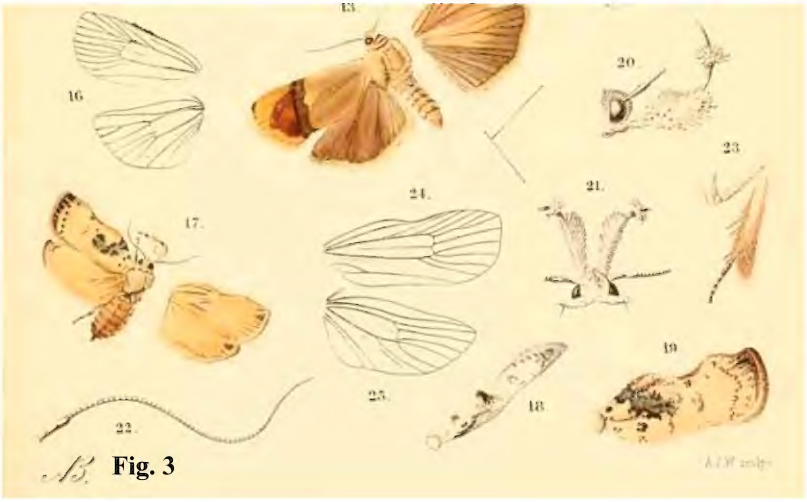

Fig. 3

In 1924 Meyrick named another species from New Guinea, *T. cyanodoxa* and in 1928 he named *T. gypsopis* from Andamans, *T. lagaropis* from the Philippines and *T. mixogama* from New Britain. In 1954 A. Diakonoff named *T. nigrimarginata* from New Guinea and in 1966 he named the following; *T. centroluta* from Borneo; *T. melanoglypha* from Java; *T. peripsacas* from the Celebes; *T. pharmacis* from Sumatra and *T. syngnoma* from Malaya. In 1968 Diakonoff also named *T. argessa* and

T. citrantha both from the Philippines, bringing the world total of named *Tonica* species to nineteen.

The life history of *Tonica niviferana* (Fig. 4) was illustrated in an article on Silk Cotton, *Bombax malabaricum* (Malvaceae), published in a Report of the Proceedings of the Second Entomological Meeting held at Pusa (India) on the 5th to 12th February 1917 Edited by T. Bainbrigge Fletcher. Part of the article read as follows: *The shoots (and stems in the case of young plants) are bored by the larvae ..... It is not a serious pest, but the young growth is stunted.* Common, 1990, lists, *Brachychiton paradoxum* (Sterculiaceae) and Cotton, *Gossypium* (Malvaceae) as host plants for *T. effractella* and states that it has been reared on *Sterculia quadrifida* (Sterculiaceae). The pupa of *Tonica* species are fully exposed and are more or less upright. This is a feature of several genera in the family Depressariidae, to which they belong.

So what species is the one in Ron's photo? Is it the Australian species *Tonica effractella* ? No, it is in fact more closely alligned to one of two unnamed species I am aware of in the Australian national insect collection (ANIC). An image representing this unnamed species can be found at

http://www.boldsystems.org/index.php/Taxbrowser_Taxonpage?taxid=325507

Fig. 4

In preparing this article I am indebted to; Ron May who posed the question and took the time to post his image; Chris Ross who kindly granted me permission to use his superb image and to the online Biodiversity Heritage Library and the various contributing libraries for access to the historical data. To see more of Chris's magnificent images visit, http://aus-natural.com/

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Photos – Fig. 1 Ron May – Fig. 2 Chris Ross

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Ed.: In Issue #73 Glenn asks for an identification of this weevil. I had numerous responses and the following is from Graham MacDonald.

"Hi Glenn, I just sat down to read Metamorphosis Australia issue 73 (June 2014) and on page 35 the photo of the weevil that you took out at Proston with Maurie caught my eye.

The insect has a few common names including Sapphire Weevil, Diamond "Beetle", and Botany Bay Diamond Weevil. The classification is Class Insecta, Order Coleoptera, Family Curculionidae, Genus Chrysolopus, species *spectabilis. Chrysolopus spectabilis* Fabr. was collected by James Cook's party at Botany Bay in 1770, and was one of the first insects to be named from Australia. The larvae and adults both feed on various Acacia species, particularly *Acacia melanoxylon*.

The wing covers (elytra) contain pits with special scales which reflect green light waves, sometimes bluish. Hope that this helps Regards Graham"

Ed.: In the same issue John asks what this curious creature is in the Fair Isle jumper.

Dear Daphne,

I noticed that in the Newsletter No. 73 on p. 36 John Mansfield asked about an odd insect rather dumpy in shape and surrounded by eggs on a cocoon.

This is an old chestnut that occasionally surfaces. I remember a notable occasion when it went the rounds of an entomological conference. It was a specimen in alcohol that had been so stirred up that it had lost its scales. As a last resort they came to me and were a bit surprised to get a species identification.

This is the wingless female of the moth *Anestia semiochrea* in the family Erebidae, subfamily Arctiinae. It is found widely in eastern Australia and is very close to *Anestia ombrophanes* which is found across southern Australia and which probably has a similar female.

The larvae feed on lichens on trunks and can sometimes be very plentiful with their wingless females. I should qualify it by saying that "wingless" may be an approximation and they could have minute wing stumps. I have not checked. The "jumper" colours can be distinctive in live specimens. Cheers, Ted Edwards

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A "You Asked" from issue #16 March 2000 - "Molly Grubs" – What are they?
We read with interest Terry Rayner's article "Nature's Resilence" in Urimbirra, journal of the Chinchilla Field Naturalist's Club. The "Molly Grubs" referred to are larvae of scarab beetles. The particular species that frequent compost heaps feeding on the decaying vegetation are different from the species that attack the roots of monocotyledons such as pasture grasses.

On the coast we have the huge larvae of the large Rhinoceros beetle which infest our compost heap and help the much smaller organisms in the composting process. We value these "grubs" and encourage their presence - we may feed the odd one or two to our Pied Butcher Birds, but otherwise they are left in peace. Their presence helps in saving us some backbreaking work in turning over the compost.

We have heard that the Yellowbelly is quite partial to scarab larvae. The native gudgeons in our pond readily take small ones, although they have a preference for worms. Strangely, although our Maggies will take both our garden worms and scarab grubs. Pied Butchers will not touch a worm if grubs are in the offing.

John and Bev Moss

BUTTERFLY AND OTHER INVERTEBRATES CLUB PROGRAMME

The Society for Growing Australian Plants Spring Flower Show

What: SGAP always has a spectacular display of native flowers and sponsor the sales of a wide range of native plants at very reasonable prices. Our club will maintain a display and have butterfly host plants for sale.
When: On Saturday October 11th and Sunday October 12th
Where: The auditorium at Mt Coot-tha Botanic Gardens
Who: All members are welcome to drop by if within range.

Planning and General Meeting

What: A talk by John Moss on some of the insects in his extensive collection will follow our quarterly planning meeting.
When: Saturday 8th November from 10 am
Where: John's place at Capalaba – address provided on RSVP
Who: All members are welcome.
RSVP: Ross Kendall on 07 3378 1187, 0402 254 370 ross@butterflyencounters.com.

DISCLAIMER

The magazine seeks to be as scientifically accurate as possible but the views, opinions and observations expressed are those of the authors. The magazine is a platform for people, both amateur and professional, to express their views and observations about invertebrates. These are not necessarily those of the BOIC. The manuscripts are submitted for comment to entomologists or people working in the area of the topic being discussed. If inaccuracies have inadvertently occurred and are brought to our attention we will seek to correct them in future editions. The Editor reserves the right to refuse to print any matter which is unsuitable, inappropriate or objectionable and to make nomenclature changes as appropriate.

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- Those members who have sent in letters and articles
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- Printing of this publication is proudly supported by Brisbane City Council

We would like to thank all these people for their contribution.

Dedicated to a better Brisbane

ARE YOU A MEMBER?

Please check your mailing label for the date your membership is due for renewal. If your membership is due, please renew as soon as possible. **Membership fees are $30.00 for individuals, schools and organizations**. If you wish to pay electronically, the following information will assist you: BSB: **484-799**, Account No: **001227191**, Account name: **BOIC**, Bank: **Suncorp**, Reference: your membership number and surname e.g. **234 Roberts.**

Butterfly and Other Invertebrates Club Inc.
PO Box 2113
RUNCORN Q. 4113

Next event – The Society for Growing Australian Plants Spring Flower Show
Saturday October 11th and Sunday October 12th, 2014